

Notice of Allowability

Application No.

10/810,771

Examiner

Jaison Joseph

Applicant(s)

MALTSEV ET AL.

Art Unit

2611

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to amendment filed on 06/21/2007.
2. ☒ The allowed claim(s) is/are 1-37.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some* c) ☐ None of the:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____
- ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
- ☐ Notice of Informal Patent Application
- ☒ Interview Summary (PTO-413), Paper No./Mail Date _____
- ☒ Examiner's Amendment/Comment
- ☒ Examiner's Statement of Reasons for Allowance
- ☐ Other _____

EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Gregory J. Gorrie on 08/17/2007.

The application has been amended as follows:

Claim 1 rewrite as: A method of communicating over a high-throughput communication channel comprising:

transmitting a channelization field as part of a current data unit, the channelization field indicating a frequency and space configuration of subsequent portions of the current data unit; and

transmitting a high-throughput training field in accordance with the frequency and space configuration indicated in the channelization field, the high-throughput training field to be used by a receiving station to estimate a channel matrix of the high-throughput communication channel,

wherein the channelization field indicates whether the high-throughput communication channel is a wideband channel, the wideband channel comprising a concurrent use of two or more valid operating channels, and

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wherein when the channelization field indicates that the high-throughput communication channel is a wideband channel, the channelization field indicates which of the two or more valid operating channels comprise the wideband channel.

Claim 12 rewrite as: A transmitter comprising:

RF circuitry to transmit a channelization field on a compatibility subchannel; and
modulators to modulate a digital bit stream representing the channelization field with a rotated binary phase shift keying (BPSK) modulation of subcarriers of the compatibility channel,

wherein the channelization field is part of a current data unit and indicates a frequency and space configuration of subsequent portions of the current data unit,

wherein the channelization field indicates whether a high-throughput communication channel used for transmitting the subsequent portions of the current data unit is a wideband channel, the wideband channel comprising a concurrent use of two or more valid operating channels, and

wherein when the channelization field indicates that the high-throughput communication channel is a wideband channel, the channelization field indicates which of the two or more valid operating channels comprise the wideband channel.

Claim 22 rewrite as: A method comprising:

generating a signal having a frame structure for a data unit comprising:

~~A frame structure for a data unit comprising:~~

a channelization field to indicate a frequency and space configuration of subsequent portions of the current data unit of a high-throughput communication channel; and

a high-throughput training field in accordance with the frequency and space configuration indicated in the channelization field, the high-throughput training field to be used by a receiving station to estimate a channel matrix of the high-throughput communication channel,

wherein the channelization field indicates whether the high-throughput communication channel is a wideband channel, the wideband channel comprising a concurrent use of two or more valid operating channels, and

wherein when the channelization field indicates that the high-throughput communication channel is a wideband channel, the channelization field indicates which of the two or more valid operating channels comprise the wideband channel.

Claim 23, rewrite as: The method ~~The frame structure~~ of claim 22 wherein each of the valid operating channels comprise a single subchannel,

wherein the channelization field further indicates whether the high-throughput communication channel comprises:

a MIMO channel comprising a single subchannel having between two and four spatial subchannels, with up to four distinct data streams transmitted thereon; or

a wideband-MIMO channel comprising two or more frequency separated subchannels wherein each subchannel has two or more spatial channels,

wherein the spatial channels comprise non-frequency-orthogonal channels associated with a signal subchannel in which orthogonality between the spatial channels is achieved by antenna diversity.

Claim 24 rewrite as: A method comprising:

generating a signal having a frame structure for a data unit comprising:

~~A frame structure for a data unit comprising:~~

a channelization field to indicate a frequency and space configuration of subsequent portions of the current data unit; and

a high-throughput training field in accordance with the frequency and space configuration indicated in the channelization field, the high-throughput training field to be used by a receiving station to estimate a channel matrix of the high-throughput communication channel,

wherein the channelization field indicates whether the high-throughput communication channel comprises one of:

a wideband channel having up to four frequency separated subchannels;

a MIMO channel comprising a single subchannel having up to four spatial subchannels, with up to four distinct data streams transmitted thereon; and

a wideband-MIMO channel comprising two or more frequency separated subchannels wherein each subchannel has two or more spatial channels,

wherein the channelization field comprises a rotated binary phase shift keying (BPSK) modulation of subcarriers of a compatibility channel, and

wherein the channelization field comprises:

a channelization mask to indicate which subchannels are used when transmitting subsequent portions of the current data unit;

transmit antenna bits to indicate a number of transmit antennas used when transmitting the subsequent portions of the current data unit;

spatial channel bits to indicate a number of spatial channels used when transmitting the subsequent portions of the current data unit;

a high-throughput training type bit to indicate whether the wideband or the MIMO channel is to be estimated; and

a header modulation bit to indicate a modulation type used for a subsequently transmitted field of the current data unit.

Claim 25 rewrite as: The method of claim 23, wherein the frame structure further comprises ~~The frame structure of claim 23 further comprising~~ a header field comprising a mask to indicate fields of the header field, the fields including at least some of: a bit-loading per subchannel, a coding rate, a length, a transmit power level, an available transmit power level, a frequency channelization request, a number of spatial channels request, a bit loading subchannel request, a power loading per subchannel request, a coding rate request, a transit power request, and a duration recommendation.

Claim 26 rewrite as: A system comprising:

one or more substantially omnidirectional antennas; and

a transmitter comprising RF circuitry to transmit a channelization field on a compatibility subchannel using the antennas, and modulators to modulate a digital bit

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stream representing the channelization field with a rotated binary phase shift keying (BPSK) modulation of subcarriers of the compatibility channel,

wherein the channelization field is part of a current data unit to indicate a frequency and space configuration of subsequent portions of the current data unit transmitted over a high-throughput communication channel,

wherein the channelization field indicates whether the high-throughput communication channel is a wideband channel, the wideband channel comprising a concurrent use of two or more valid operating channels,

and wherein when the channelization field indicates that the high-throughput communication channel is a wideband channel, the channelization field indicates which of the two or more valid operating channels comprise the wideband channel.

Claim 26 rewrite as: A computer-readable medium storing instructions, which when executed by one or more processors, cause the processors to perform operations comprising:

generating a channelization field as part of a current data unit, the channelization field indicating a frequency and space configuration of subsequent portions of the current data unit; and

generating a high-throughput training field in accordance with the frequency and space configuration indicated in the channelization field, the high-throughput training field to be used by a receiving station to estimate a channel matrix of a the high-throughput communication channel,

wherein the channelization field indicates whether the high-throughput communication channel is a wideband channel, the wideband channel comprising a concurrent use of two or more valid operating channels, and

wherein when the channelization field indicates that the high-throughput communication channel is a wideband channel, the channelization field indicates which of the two or more valid operating channels comprise the wideband channel.

Claim 32 rewrite as: A method of communicating over a high-throughput communication channel comprising:

transmitting a channelization field and a high-throughput training field as part of a current data unit, the channelization field indicating a frequency and space configuration of subsequent portions of the current data unit, the high-throughput training field being in accordance with the frequency and space configuration indicated in the channelization field, the high-throughput training field to be used by a receiving station to estimate a channel matrix of the high-throughput communication channel,

wherein the channelization field indicates whether the high-throughput communication channel is a wideband channel, the wideband channel comprising a concurrent use of two or more valid operating channels, and

wherein when the channelization field indicates that the high-throughput communication channel is a wideband channel, the channelization field indicates which of the two or more valid operating channels comprise the wideband channel.

REASONS FOR ALLOWANCE

The following is an examiner's statement of reasons for allowance: Claims 1 – 37 are allowable over prior art of record. The prior art of record failed to teach a method of communicating over a high-throughput communication channel comprising: transmitting a channelization field as part of a current data unit, the channelization field indicating a frequency and space configuration of subsequent portions of the current data unit; and transmitting a high-throughput training field in accordance with the frequency and space configuration indicated in the channelization field, the high-throughput training field to be used by a receiving station to estimate a channel matrix of the high-throughput communication channel, wherein the channelization field indicates whether the high-throughput communication channel is a wideband channel, the wideband channel comprising a concurrent use of two or more valid operating channels, and wherein when the channelization field indicates that the high-throughput communication channel is a wideband channel, the channelization field indicates which of the two or more valid operating channels comprise the wideband channel as claimed in independent claim 1 and similarly claimed in independent claims 10, 12, 20, 22, 24, 26, 29, and 32. Thus claims 1 – 37 are novel and unobvious over prior art of record.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jaison Joseph whose telephone number is (571) 272-6041. The examiner can normally be reached on M-F 9:30 - 6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh Fan can be reached on (571) 272-3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Jaison Joseph
08/17/2007


CHIEH M. FAN
SUPERVISORY PATENT EXAMINER